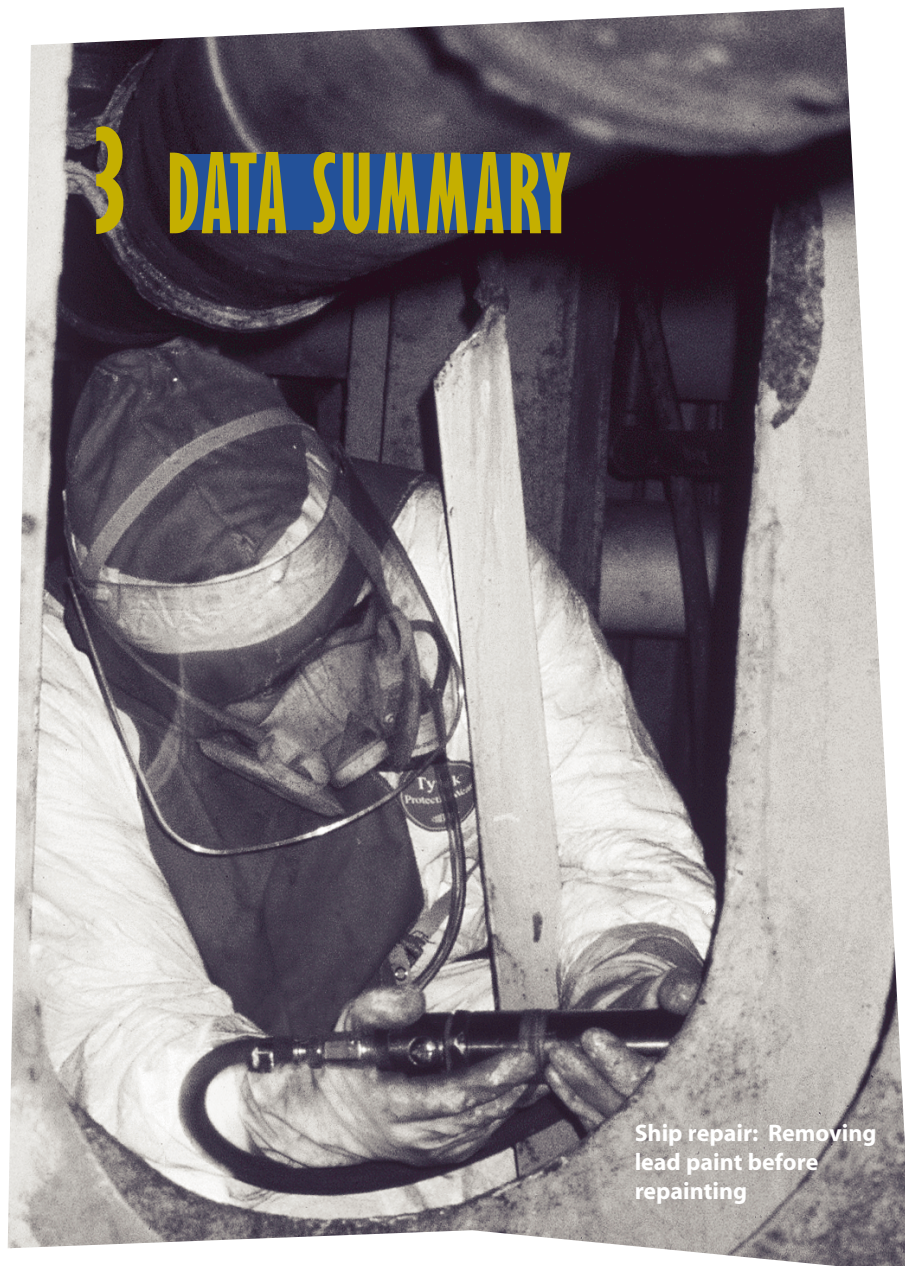


### 3 DATA SUMMARY



Ship repair: Removing lead paint before repainting

## BLOOD LEAD LEVELS

**Between January 1, 1995 and December 31, 1999, OLPPP received 47,906 blood lead level reports for individuals aged 16 and over.**

After investigation, we determined that a total of 46,525 of these reports were for individuals occupationally exposed to lead.<sup>7</sup> Because many workers are tested several times each year, the number of reports exceeds the number of individuals in the Registry; during this five-year period the total number of individual workers reported to the Registry was 17,775. These individuals were employed by 1,030 different employers. See Appendix B, Table 1 for details.

## Distribution of Blood Lead Levels

The level of lead in the blood is a direct index of worker exposure as well as an indication of the potential for adverse effects on health. Low exposures that in the past were thought safe are now considered hazardous as new information emerges about the toxicity of lead.

The General Industry Lead Standard requires medical removal when a worker has a BLL of 60  $\mu\text{g}/\text{dl}$  or greater, or has an average BLL of 50  $\mu\text{g}/\text{dl}$  on the last three tests. The Construction Standard requires removal when the BLL reaches 50  $\mu\text{g}/\text{dl}$ . However, serious damage to the neurological, reproductive, and blood-forming systems can occur below these levels. There is growing evidence of harm to human health at levels below 40  $\mu\text{g}/\text{dl}$  including increased blood pressure, brain and nerve damage, sperm abnormalities, and impaired learning ability in children who were exposed to lead during gestation. For comparison, the average BLL of adults in the United States is less than 2  $\mu\text{g}/\text{dl}$  (CDC, 2001).

Of the 17,775 workers reported to the Registry during the five-year period 1995 through 1999, 2,657 workers had a peak blood lead level at or above 25  $\mu\text{g}/\text{dl}$ ; 557 workers had a peak BLL at or above 40  $\mu\text{g}/\text{dl}$  and may have suffered serious damage to

<sup>7</sup> Results are assumed to arise from occupational lead exposure, unless known otherwise. We do not attempt to find out whether exposure is occupational or non-occupational if the BLL is less than 25  $\mu\text{g}/\text{dl}$ .

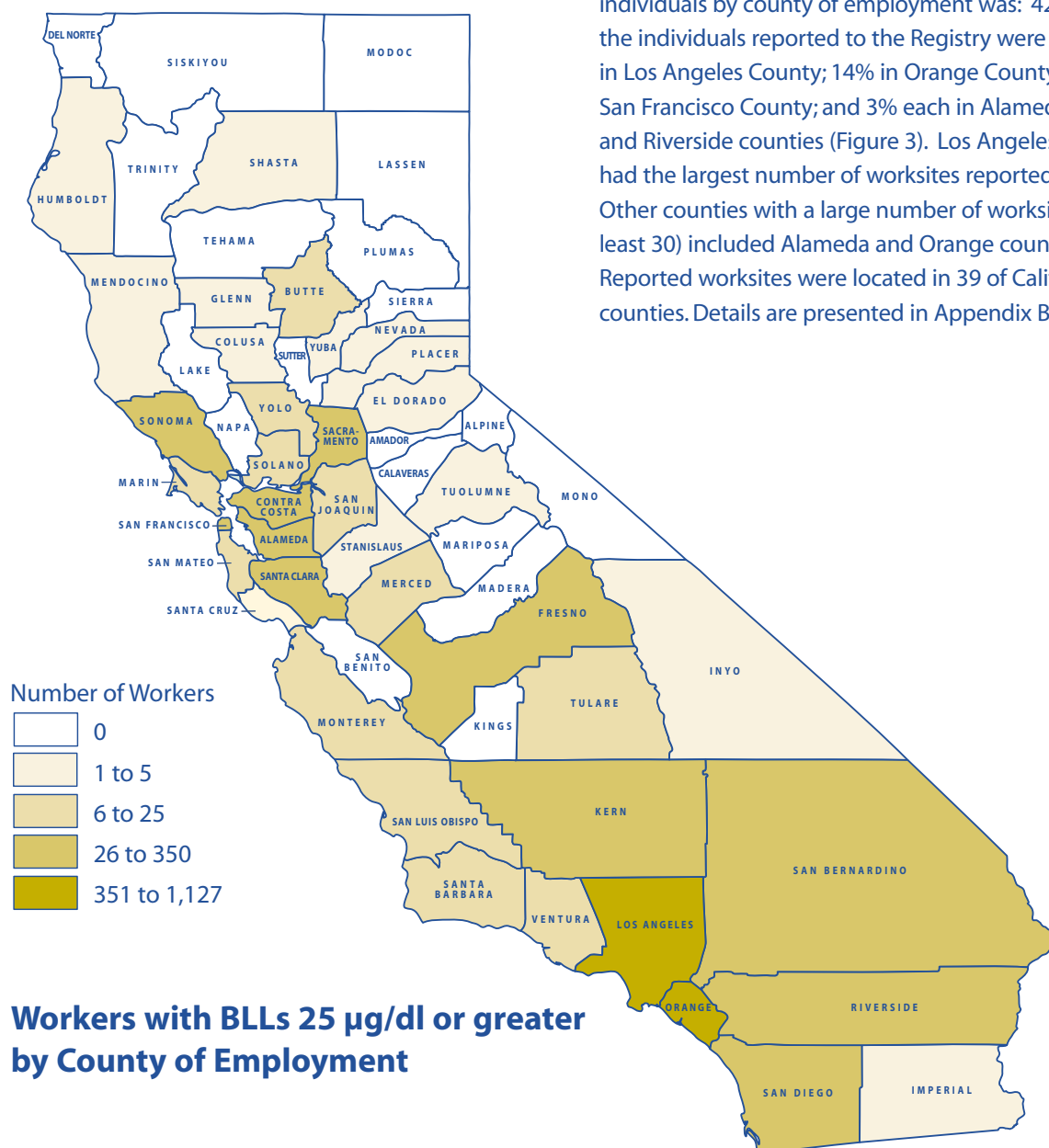
their health as a result of these overexposures. BLLs ranged up to a high of 221 µg/dl.

BLL distributions by year are presented in Appendix B, Table 2. During the five-year period 1995-99, the proportion of BLLs in the categories of 60 µg/dl and above, 50-59 µg/dl, and 40-49 µg/dl decreased slightly, while the proportion of BLLs in the 25-39 µg/dl category increased from 80% to 87%.

**NOTE: Individuals with a peak BLL below 25 µg/dl were removed prior to developing the distributions for the remainder of this report because not all laboratories report BLLs between 1 and 24 µg/dl.**

## County of Employment

The 1995 through 1999 distribution of individuals by county of employment was: 42% of the individuals reported to the Registry were employed in Los Angeles County; 14% in Orange County; 4% in San Francisco County; and 3% each in Alameda, Fresno, and Riverside counties (Figure 3). Los Angeles County had the largest number of worksites reported (158). Other counties with a large number of worksites (at least 30) included Alameda and Orange counties. Reported worksites were located in 39 of California's 58 counties. Details are presented in Appendix B, Table 3.



**Figure 3**

## Gender and Age Distribution

The overwhelming majority of workers reported to the Registry from 1995 through 1999 were male (94%). The age distribution was typical for a working population; most of the workers were between 20 and 59 years of age (95%) (Appendix B, Table 4).

## Racial and Ethnic Distribution

Although laboratories are requested to report the patient's race (white, black, Asian, other), this information is rarely provided. Therefore, it is not possible to describe the racial distribution of workers in the Registry.

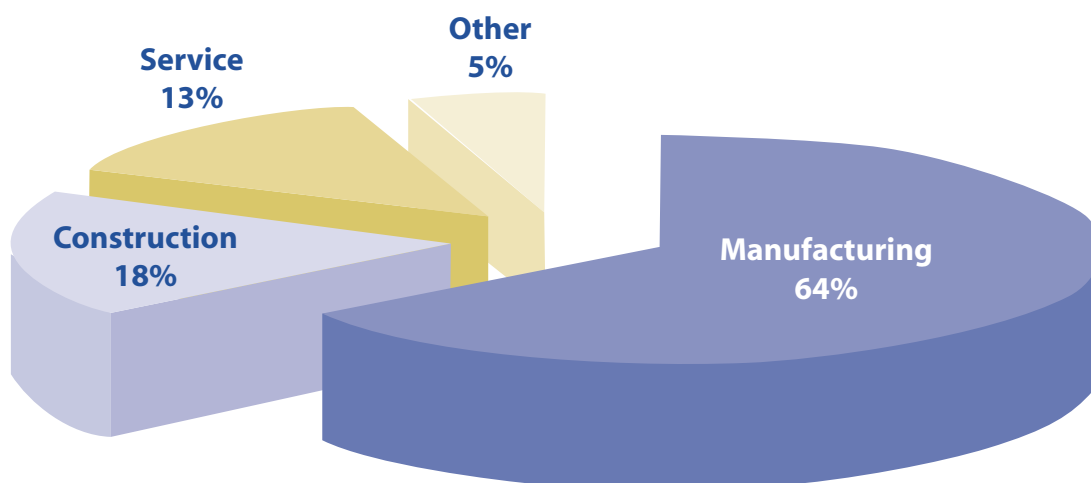
The racial/ethnic description of Registry data is limited to the identification of persons with Spanish surnames as a surrogate for Hispanic ethnicity. Surnames of persons reported to the Registry are compared to the U.S. Bureau of the Census list of Spanish surnames (U.S. Department of Commerce, 1980). The majority of persons reported to the Registry had Spanish surnames (52%) (Appendix B, Table 4). For comparison, 28% of the California workforce is Hispanic (U.S. Department of Labor, 2001).

## Industry Sector

The majority of persons reported to the Registry in 1995-99 with elevated BLLs (25 µg/dl or greater) worked in manufacturing (64%), including storage battery manufacture, nonferrous secondary smelters, and manufacture of non-tableware pottery products. Individuals were also employed in construction (18%) and service industries (13%). (See Figure 4.) Construction industries include wrecking and demolition, masonry (furnaces in lead smelters), and painting. Included in the service industries are radiator repair shops and firing ranges. Six of the 14 workers listed in retail trade (i.e., all workers with BLLs 50 µg/dl or greater) came from a single employer, a sporting goods store whose employees were exposed to high levels of lead while demolishing an old firing range. (See Appendix B, Table 5 for BLL distributions by industry sector.)

## Specific Industry

Among the workers with elevated BLLs reported in 1995 through 1999, the ten specific industries with the largest number of individuals reported are shown



**Percent of BLLs 25 µg/dl or greater by Industry Sector**

**Figure 4**

## Top Ten Industries with Largest Number of Workers Reported with BLLs 25 µg/dl or greater, 1995 -1999

- |                                  |                             |
|----------------------------------|-----------------------------|
| 1. Storage Battery Manufacturing | 6. Masonry                  |
| 2. Nonferrous Secondary Smelting | 7. Firing Ranges            |
| 3. Radiator Repair               | 8. Scrap Metal Recycling    |
| 4. Painting                      | 9. Pottery Manufacture      |
| 5. Copper/Brass Foundries        | 10. Wrecking and Demolition |

**Figure 5**

in Figure 5. Table 6 in Appendix B shows the BLL distributions by specific industry for all workers reported in the period 1995 through 1999 with BLLs of 25 µg/dl or greater.

### Battery Manufacturing and Battery Recycling Industries

The potential for serious lead exposure and lead poisoning in the lead-acid battery manufacturing and recycling industries is well-known and periodic blood lead testing is common among employers in these industries. Seventy percent (70%) of the occupational BLL reports we received during the period 1995-1999 came from the battery industries. Over 95% of lead-exposed workers in these industries in California are part of a blood lead testing program. We receive all blood lead test results, regardless of level, for almost all the battery manufacturing and recycling workers in the State. There is no other industry in California for which we have such complete data.

The availability of BLL data on nearly all battery workers gives us an accurate picture of the incidence of lead poisoning in these industries. In addition, with nearly complete BLL data at the lower levels (1-24 µg/dl) we can look at changes in the distribution of blood lead levels in these industries over the five year period 1995-1999 (See Appendix B, Table 7). After 1995 there were no reports of workers with BLLs at or above 60 µg/dl. Additionally, over the 5-year period, the percentage of BLLs at the lower end of the distribution increased and the percentage of reports at the higher end decreased. These data indicate that

the battery industries have made progress in reducing worker exposure to lead. Still, the hundreds of individuals with elevated BLLs (25 µg/dl or greater) indicate that additional effort is needed to reduce lead exposure in these industries.

### Non-Occupational Reports

During the period 1995-1999, we received BLL reports for 265 adults whose lead exposure we determined was non-occupational. Most of these reports were identified as non-occupational when we called a medical provider to complete employer information on reports 25 µg/dl or greater. In a few cases, the lead source was identified as non-occupational on the LRF. BLLs ranged up to 273 µg/dl. Sixty-nine percent were male and 31% female; 36% had Spanish surnames. For 156 of the 265 individuals we know the specific lead exposure source (See Table 8 for BLL distributions by source). The most frequent reported sources of non-occupational lead exposure were retained bullets, target shooting, and pica.<sup>8</sup>

All reports of individuals that are found to be non-occupational are referred for follow-up to the Childhood Lead Program in the county in which the individual resides. Follow-up often includes referral to a health practitioner who specializes in lead, testing of other family members, and inspection of the home environment for possible sources of lead.

<sup>8</sup> An abnormal craving to eat nonfood items such as clay or paint.

# SYSTEM OPERATION

## Reporting Sources

OLPPP receives blood lead test results from laboratories located in California as well as laboratories in other states. For the period from 1995 through 1999, the majority of reports received by OLPPP (70%) were analyzed by laboratories in other states, while 30% of reports were analyzed by California laboratories.

## Timeliness

CDHS requests that laboratories report blood lead results to the Department within 72 hours of analysis in order to ensure adequate and timely follow-up of serious cases of lead poisoning. Very few laboratories, however, report blood lead results that rapidly. Laboratories within California generally report results more quickly, in part because out-of-state laboratories tend to group reports and forward them to CDHS in bunches rather than individually. For the period from 1995 through 1999, 10% of reports were received from California labs more than one month after analysis; 22% of reports from out-of-state labs were received more than one month after analysis. Only 14% of reports from California labs and 2% of reports from out-of-state labs were received within the requested 72 hours.

## Completeness

We estimate that one quarter to one third of the reports received by OLPPP did not contain complete information on patient demographics or employer. In these situations OLPPP staff had to contact the reporting laboratory and/or requesting provider (or employer) in order to obtain missing information.

With extensive effort, we were able to obtain a significant percentage of the missing information. We had information on gender for nearly 100% of the individuals reported. Information on age was 95% complete. We had information on employer and worksite location for 85% of individuals reported to the Registry, and information on county of residence for 90% of the workers reported to the Registry.